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HMC231G7

GaAs MMIC SMT HIGH ISOLATION SPST SWITCH, DC - 6.0 GHz

Typical Applications

The HMC231G7 is ideal for:

- Telecom Infrastructure
- Microwave Radio & VSAT
- Military Radios, Radar & ECM
- Space Systems
- Test Instrumentation

Features

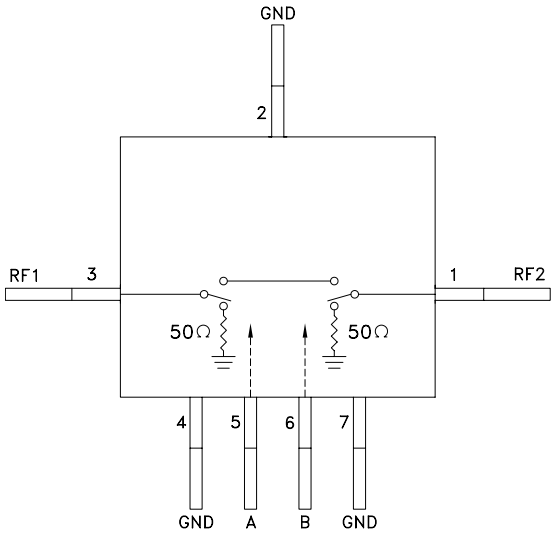
Isolation: 55 dB @ 2.0 GHz
42 dB @ 6.0 GHz

Insertion Loss: 2.0 dB Typical @ 6.0 GHz

Non-Reflective Input/Output

Hermetic Surface Mount Package

Functional Diagram



General Description

The HMC231G7 is a broadband high isolation non-reflective GaAs MESFET SPST switch in a hermetic surface mount package. Covering DC to 6.0 GHz, the switch features >55 dB isolation up to 2 GHz and >42 dB isolation up to 6.0 GHz. The switch operates using complementary negative control voltage logic lines of -5/0V and requires no bias supply. When the "OFF" state is selected, both RF1 and RF2 ports are terminated in 50 Ohms.

Electrical Specifications, T_A = +25° C, With 0/-5V Control, 50 Ohm System

Parameter	Frequency	Min.	Typ.	Max.	Units
Insertion Loss	DC - 2.0 GHz DC - 4.0 GHz DC - 6.0 GHz		1.3 1.4 2.0	1.6 1.7 2.4	dB dB dB
Isolation	DC - 2.0 GHz DC - 4.0 GHz DC - 6.0 GHz	50 43 37	55 48 42		dB dB dB
Return Loss "On State"	DC - 2.0 GHz DC - 4.0 GHz DC - 6.0 GHz		17 15 12		dB dB dB
Return Loss "Off State"	DC - 2.0 GHz DC - 4.0 GHz DC - 6.0 GHz		15 13 12		dB dB dB
Input Power for 1 dB Compression	0.5 - 6.0 GHz	23	27		dBm
Input Third Order Intercept (Two-Tone Input Power= +7 dBm Each Tone, 1 MHz Tone Separation)	0.5 - 6.0 GHz		49		dBm
Switching Characteristics tRISE, tFALL (10/90% RF) tON, tOFF (50% CTL to 10/90% RF)	DC - 6.0 GHz		 3 6		 ns ns

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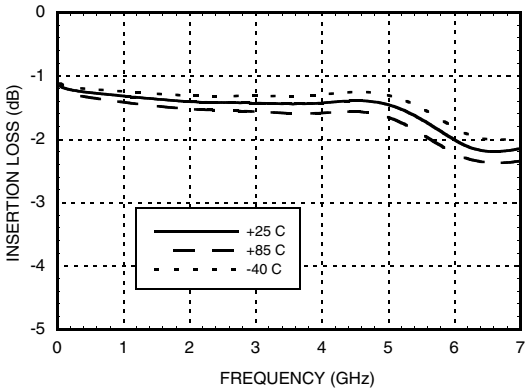
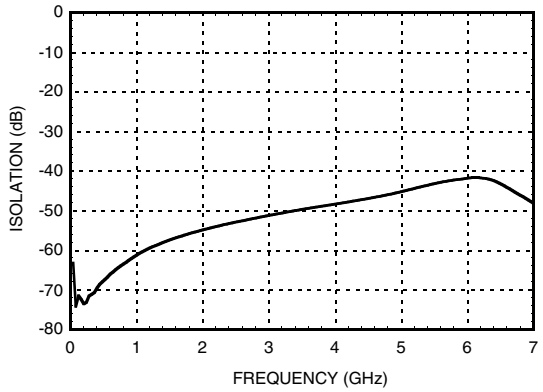
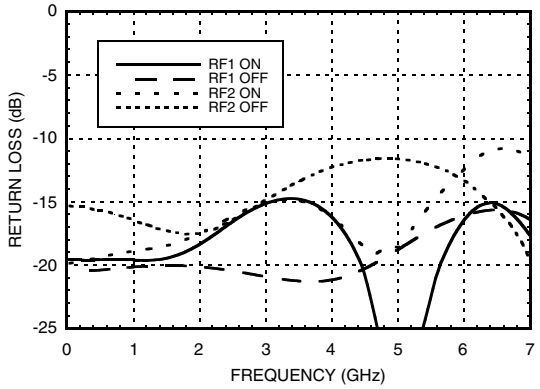
Insertion Loss



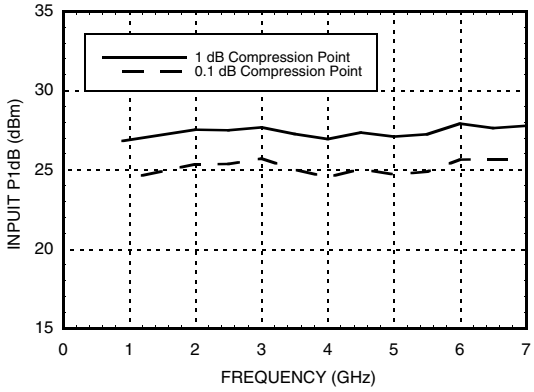
Isolation



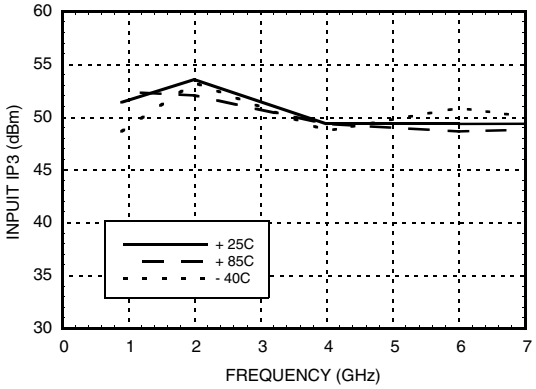
Return Loss



0.1 and 1 dB Input Compression Point



Input Third Order Intercept Point



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Control Voltages

State	Bias Condition
Low	0 to -0.2V @ 10 uA Max.
High	-5V @ 10 uA Typ. to -7V @ 45 uA Typ.

Truth Table

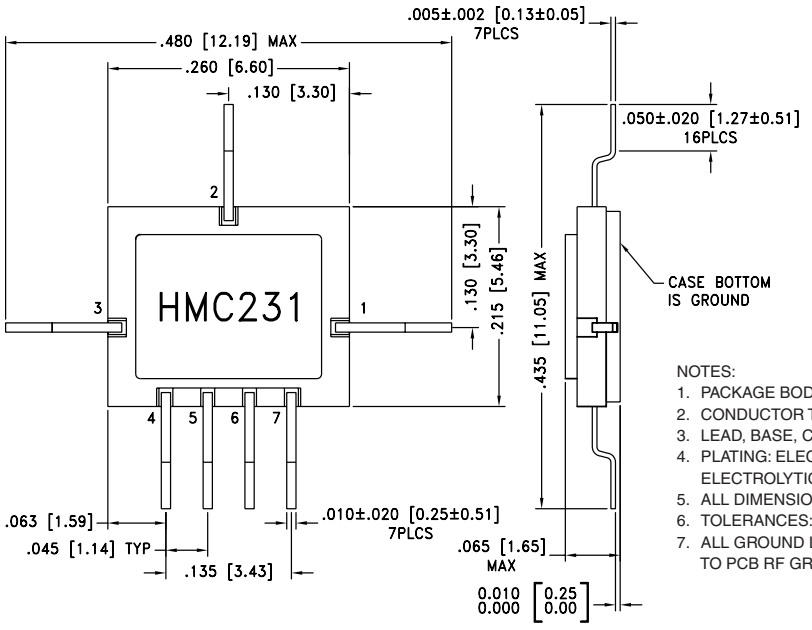
Control Input		Signal Path State
A	B	RF1 to RF2
High	Low	ON
Low	High	OFF

Caution: Do not "Hot Switch" power levels greater than +27 dBm (Vctl = 0/-5 Vdc).

Absolute Maximum Ratings

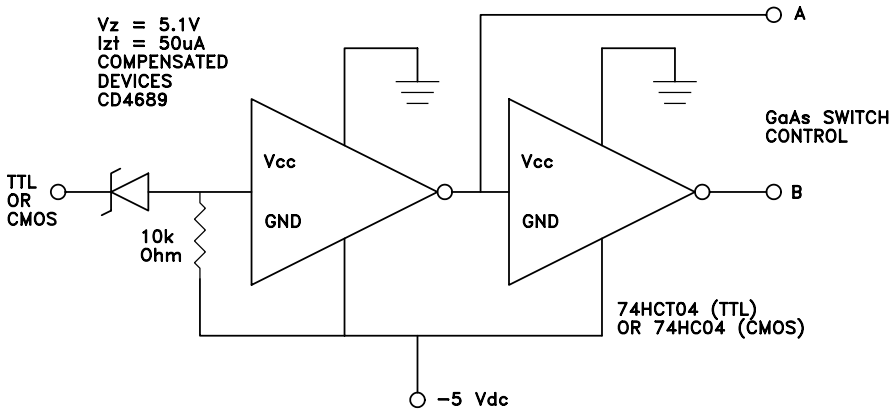
RF Input Power (Vctl= -5V) (0.5 - 6 GHz)	+30 dBm (@ +50 °C)
Control Voltage Range (A & B)	+1.0V to -7.5 Vdc
Channel Temperature	150 °C
Thermal Resistance (R_{TH}) (junction to lead)	94 °C/W
Storage Temperature	-65 to +150 °C
Operating Temperature	-40 to +85 °C

Outline Drawing

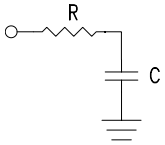


NOTES:
1. PACKAGE BODY MATERIAL: WHITE ALUMINA 92%
2. CONDUCTOR TRACES MATERIAL: THICK FILM TUNGSTEN.
3. LEAD, BASE, COVER MATERIAL: KOVAR™.
4. PLATING: ELECTROLYTIC GOLD 50 MICROINCHES MIN, OVER ELECTROLYTIC NICKEL 50 MICROINCHES MIN.
5. ALL DIMENSIONS ARE IN INCHES [MILLIMETERS].
6. TOLERANCES: .±005 [0.13] UNLESS OTHERWISE SPECIFIED.
7. ALL GROUND LEADS AND GROUND PADDLE MUST BE SOLDERED TO PCB RF GROUND.

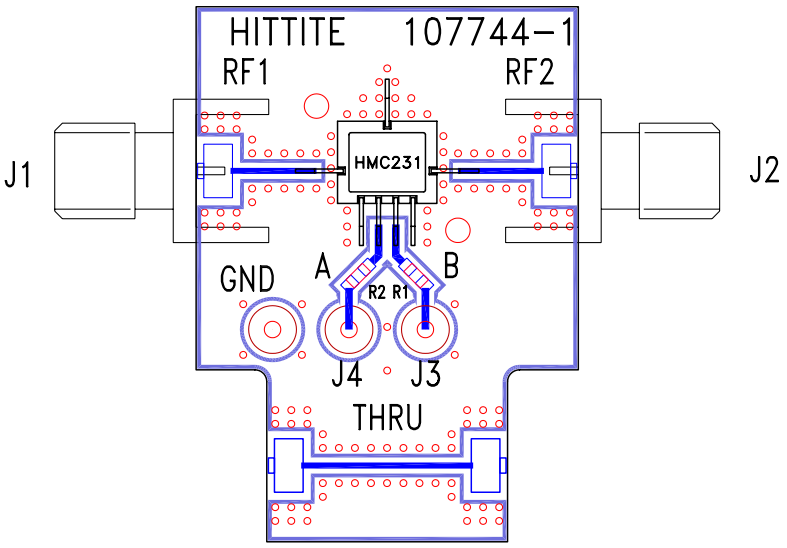
Suggested Driver Circuit



Pin Descriptions

Pin Number	Function	Description	Interface Schematic
1, 3	RF2, RF1	This pin is DC coupled and matched to 50 Ohm. Blocking capacitors are required if RF line potential is not equal to 0V.	
2, 4, 7	GND	Package bottom must also be connected to PCB RF ground.	
5	A	See truth table and control voltage table.	
6	B	See truth table and control voltage table.	

Evaluation PCB



List of Material

Item	Description
J1 - J2	PC Mount SMA RF Connector
J3 - J4	DC Pin
R1, R2	100 Ohm Resistor, 0603 Pkg.
U1	HMC231G7 SPDT Switch
PCB*	107744 Evaluation PCB
* Circuit Board Material: Rogers 4350	

The circuit board used in the final application should be generated with proper RF circuit design techniques. Signal lines at the RF port should have 50 ohm impedance and the package ground leads and package bottom should be connected directly to the ground plane similar to that shown above. The evaluation circuit board shown above is available from Hittite Microwave Corporation upon request.

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Notes: